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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,397	03/05/2001	Alok Sharma	PBC.2001.02	2689
44987	7590	10/05/2005	EXAMINER	
HARRITY & SNYDER, LLP 11240 WAPLES MILL ROAD SUITE 300 FAIRFAX, VA 22030			HOYE, MICHAEL W	
			ART UNIT	PAPER NUMBER
			2614	

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/800,397	SHARMA, ALOK	
	Examiner	Art Unit	
	Michael W. Hoye	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,5-7 and 9-23 is/are rejected.
- 7) ☒ Claim(s) 2-4 and 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/09/02, 11/12/02, 11/13/02, 11/14/02, 11/15/02, 11/16/02, 11/17/02, 11/18/02, 11/19/02, 11/20/02, 11/21/02, 11/22/02, 11/23/02, 11/24/02, 11/25/02, 11/26/02, 11/27/02, 11/28/02, 11/29/02, 11/30/02</u> | 6) <input type="checkbox"/> Other: ____ |

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DETAILED ACTION

Oath/Declaration

1. The signed Oath and Power of Attorney filed on June 4, 2001 appears to be missing from the USPTO file. The Applicant is respectfully requested to submit a copy of the signed Oath previously filed on June 4, 2001.

Claim Objections

2. Claim 2 is objected to because of the following informalities: at the end of line 23 in the claim, the word --and-- should be added after the word "frequency;". Appropriate correction is required.

Claim 3 is objected to because of the following informalities: the claim appears to be dependent upon claim 2 or claim 1. Appropriate correction is required.

Claim 4 is objected to because of the following informalities: in line 11 of the claim the word "bandbass" appears to be a typographical error and should be --bandpass--. Appropriate correction is required.

Claim 9 is objected to because of the following informalities: in line 8 of the claim the words "and and" should be --and a--. Also, in claim 9 the claimed "third plurality of downstream channels" and "fourth plurality of upstream channels" appears to lack antecedent basis, since in claim 1 there are "a first plurality of channels" and "a second plurality of channels". It appears that the claim language may be referring to a "third plurality of channels

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comprising downstream channels” and a “fourth plurality of channels comprising upstream channels”. Appropriate correction and clarification is required.

Claim 18 is objected to because of the following informalities: the claim appears to be dependent upon claim 17 or another claim other than claim 14. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), cited by the Applicant.

As to claim 1, note the Barham et al reference which discloses a method of demodulating multiple channels. In Figure 18, Barham et al discloses a high speed demodulator system. The claimed providing a first analog to digital converter having an analog input and a digital output is met by analog to digital converter (ADC) 102 (Fig. 18), which has an analog input and a digital output. The claimed providing a first plurality of digital demodulators is met by a bank of parallel programmable demodulators 10 connected to an output of the high speed demultiplexer. Barham et al does not explicitly disclose the claimed each demodulator having a programmable center frequency. However, since Barham et al teaches that the bank of demodulators 10 are programmable, it would have been obvious for one of ordinary skill in the art at the time of the

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invention that each demodulator 10 could have easily been programmed to have a center frequency, and each center frequency being different from the other center frequencies (see col. 3, line 43 – col. 4, line 57). The claimed coupling a band of frequencies to the analog input of the converter, the band including a second plurality of channels is met by col. 4, lines 34-44, where Barham et al discloses that the demodulator system of parallel programmable demodulators 10 may be used in an advanced data communications system that includes CDMA systems, TDMA systems, etc. Accordingly, the high speed demodulator system in Fig. 18 receives a band of frequencies at the RF front end 101, wherein the band of frequencies includes a second plurality of channels as appreciated by one of ordinary skill in the art. The claimed creating digitized samples of the band at the output of the first converter is met by the ADC 102, which outputs digitized samples. The claimed coupling the digitized samples to the plurality of demodulators is met by the digitized samples are coupled to the demodulators 10 through the high speed demultiplexer (DEMUX) 103. The claimed demodulating a first plurality of channels from the band of frequencies is met by demodulators 10 demodulate pluralities of channels from the band of frequencies.

As to claim 16, the claimed wherein each demodulator uses a FIR digital filter is met by the abstract of Barham et al, which discloses that, “A parallel programmable demodulator includes a reconfigurable FIR filter.”

As to claim 17, the claimed wherein each FIR filter is an Optimum Equiripple Linear-Phase filter is a matter of design choice as known to those of ordinary skill in the art of filter design.

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As to claim 18, the claimed wherein the filter coefficients are designed using a Chebyshev approximation is a matter of design choice, which is well known to those of ordinary skill in the art of filter design.

As to claim 19, the claimed wherein the Parks-McClellan Alternation theorem is used in the approximation is a matter of design choice, which is well known to those of ordinary skill in the art of filter design.

As to claim 20, the claimed wherein the coefficients are computed using the Remez exchange algorithm is a matter of design choice, which is well known to those of ordinary skill in the art of filter design.

As to claim 21, the claimed wherein the coefficients are computed using the Rabiner exchange algorithm is a matter of design choice, which is well known to those of ordinary skill in the art of filter design.

As to claims 22-23, the claimed number of coefficients for each filter is at least 16 (claim 22) and is at most 24 (claim 23) is also a matter of design choice, which is well known to those of ordinary skill in the art of filter design, in addition to, as is well known in the art, tradeoffs must be made between passband ripple (less is better), stopband attenuation (more is better), for a fixed number of coefficients. Therefore, the number of coefficients selected by the inventor or designer is relative to the type of tradeoff benefits the designer would like to gain or lose as described above.

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5. Claims 5-7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), in view of Quigley et al (USPN 6,650,624 B1), both cited by the Applicant.

As to claim 5, the claimed [A/D] converter and the demodulators are within the upstream section of a CMTS channel bank organized into upstream and downstream channels is not explicitly disclosed by the Barham et al reference. However, Quigley et al discloses in Fig. 26 and in col. 37, lines 29-45, a cable modem termination system (CMTS) including a plurality of demodulators 700a-700n, which receive modulated data input from a plurality of cable modems via a common transmission medium. The demodulators 700a-700n provide a demodulated data output for the frequency division multiplexed (FDM) upstream channels via which data is transmitted from the plurality of cable modems to the CMTS. The Quigley et al reference further teaches or discloses that the cable modems communicate with the CMTS via time division multiple access (TDMA). Although the Quigley et al reference does not explicitly disclose an ADC within the CMTS, the Barham et al reference as described above in claim 1, discloses a high speed demodulator system that may be used in an advanced data communication system that includes TDMA systems. Therefore, regarding the teachings of Barham et al, it would have been obvious for one of ordinary skill in the art at the time of the invention to have modified the high speed demodulator system of Barham et al to further include implementing the system into the CMTS as taught by Quigley et al for the advantage of having a CMTS channel bank organized into upstream and downstream channels. Also see the Applicant's admitted prior art in Fig. 17A.

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As to claim 6, the claimed ratio of the number of upstream channels demodulated by the CMTS channel bank to the number of upstream input connectors of the CMTS channel bank is M is met by a matter of design choice as appreciated by one of ordinary skill in the art in the design of CMTS architecture.

As to claim 7, the claimed method of claim 6, wherein M is 16 is rejected on the same grounds as claim 6, since the claim has similar scope as claim 6.

As to claim 13, the claimed CMTS is DOCSIS compatible is rejected based on the fact that it is well known in the art of cable modem technology that a CMTS is DOCSIS compatible.

6. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), in view of Quigley et al (USPN 6,650,624 B1), in further view of Peyrovian (USPN 5,768,682), cited by the Examiner.

As to claim 14, the claimed upstream channels are in the 750-1000 MHz portion of the spectrum is met by a matter of design choice, which is well known to those of ordinary skill in the art of transmitting data over cable service. Although, the claimed upstream channels are in the 750-1000 MHz portion of the spectrum is not explicitly disclosed by the Barham et al or the Quigley et al references, the Peyrovian reference specifically teaches in col. 3, lines 38-53, that at least a portion of the upstream information may be modulated in a high frequency band (750-1000 MHz). Furthermore, Peyrovian teaches in col. 3, lines 44-53 that, "there are several advantages to modulating at least a portion of the upstream information via a carrier to such a high frequency band. First, the high frequency band (750-1000 MHz) lying above the downstream information band (e.g., 50-750 MHz) is typically much less susceptible to noise than

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the low frequency band (5-40 MHz) that has traditionally been employed to carry the upstream information. Further, the frequency band of 750-1000 MHz has a much greater bandwidth than the low frequency band of 5-40 MHz.” Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have further combined the Barham et al and Quigley et al references with the Peyrovian reference which specifically discloses modulating the upstream channels in the 750-1000 MHz portion of the spectrum for the advantages given above.

As to claim 15, regarding the claimed at least one frequency stacker is used to densely pack each sub-band of the 750-1000 MHz spectrum portion. The Examiner takes Official Notice that it is notoriously well known in the art of data transmission over cable service to densely pack each sub-band of a given radio frequency (RF) spectrum portion (i.e. 750-1000 MHz) using at least one frequency stacker, for the advantage of efficiently using each sub-band in the given frequency spectrum so that the maximum amount of sub-bands in the spectrum may be used for sending data over the cable line. Therefore, it is submitted that it would have been clearly obvious to one of ordinary skill in the art at the time of the invention to have used at least one frequency stacker to densely pack each sub-band of the 750-1000 MHz spectrum portion for the advantage given above.

7. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), in view of Quigley et al (USPN 6,650,624 B1), in further view of the Applicant’s admitted prior art in Fig. 17(A).

As to claim 9, the claimed CMTS channel bank is organized using a plurality of modules, each module having a third plurality of downstream channels and a fourth plurality of upstream

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channels is met by admitted prior art Fig. 17(A), that discloses a CMTS channel bank with a module of 4 downstream connectors for channels and 16 upstream connectors for channels and there are 8 modules in the bank, which directly corresponds to the claimed features. The claimed features are not patentable in view of the disclosure of the admitted prior art.

As to claim 10, the claimed third plurality [of downstream channels] is 4 and the fourth plurality [of upstream channels] is 16 is met by admitted prior art Fig. 17(A), that discloses a CMTS channel bank with a module of 4 downstream connectors for channels and 16 upstream connectors for channels and there are 8 modules in the bank, which directly corresponds to the claimed features. The claimed features are not patentable in view of the disclosure of the admitted prior art.

As to claim 11, the claimed channel bank has 8 modules is met by admitted prior art Fig. 17(A), that discloses a CMTS channel bank with a module of 4 downstream connectors for channels and 16 upstream connectors for channels and there are 8 downstream/upstream modules in the bank, which directly corresponds to the claimed feature. The claimed feature is not patentable in view of the disclosure of the admitted prior art.

As to claim 12, the claimed CMTS channel bank has 32 downstream channels and 128 upstream channels is met by admitted prior art Fig. 17(A), that discloses a 32 downstream by 128 upstream CMTS channel bank, which directly corresponds to the claimed feature. The claimed feature is not patentable in view of the disclosure of the admitted prior art.

Allowable Subject Matter

8. Claims 2-4 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to dependent claim 2, the prior art alone or in combination does not teach or properly suggest the claimed method of claim 1, further including: a) maintaining pre-computed sets of D.C. filter coefficients in non-volatile storage, each set corresponding to one of multiple prototype low-pass digital filters, each prototype filter having one of a predetermined set of bandwidths; b) selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; c) retrieving the D.C. coefficients to a band-pass transformation corresponding to the first center frequency; and e) loading the transformed coefficients into coefficient latches in the first demodulator.

Claims 3-4 and 8 are dependent upon claim 2.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael W. Hoye whose telephone number is **571-272-7346**. The examiner can normally be reached on Monday to Friday from 8:30 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Miller, can be reached at **571-272-7353**.

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Michael W. Hoyer
September 27, 2005



JOHN MILLER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600